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GLOSSARY OF TERMS IN ORTHOPAEDICS

PART III ORTHOPAEDIC SURGERY

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GLOSSARY OF TERMS IN ORTHOPAEDICS

PART III ORTHOPAEDIC SURGERY

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GLOSSARY OF TERMS IN ORTHOPAEDICS

PART III ORTHOPAEDIC SURGERY

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 17 May 1982, after the draft finalized by the Orthopaedic Instruments and Accessories Sectional Committee had been approved by the Consumer Products and Medical Instruments Division Council.

0.2 The definition of an item is very important as it provides information on its technical aspects. Uniformity in definitions will also eliminate different interpretations and disputes.

0.3 This Indian Standard is based on ISO/DP 6017/III·2 ' Implants for Surgery — Terminology Part III — Orthopaedic Surgery ' issued by the International Organisation for Standardization.

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1. SCOPE

1.1 This standard specifies definitions relevant to orthopaedic surgery.

2. TERMINOLOGY

2.1 Anatomy and Physiology — General

Term	*Definition*
Skeleton	Bony and cartilaginous framework of body. Divisible into axial skeleton (skull, spine, ribs, sternum and pelvis) and appendicular skeleton (bones of upper and lower limbs).
Vertebral column SPINE	Axial skeleton of body composed of multiple individual units vertebrae sacrum and coccyx together with invertebral discs.
Upper limb girdle	Comprising the collar bone (clavicle) and shoulder blade (scapula) and associated joints. (Formerly shoulder girdle). NOTE — There are two upper limb girdles—right and left. Contrast lower limb girdle.

Term	*Definition*
Shoulder	Between upper limb girdle and arm (anatomical).
Axilla ARMPIT	Hollow under shoulder between upper arm and chest wall.
Arm	(Anatomical.) Upper limb between shoulder and elbow (bone: Humerus).
Elbow	Between arm (anatomical) and forearm.
Antecubital fossa	Area overlying front of elbow joint.
Forearm	Between elbow and wrist (bones: radius and ulna).
Wrist	Between forearm and carpus.
Hand	Upper limb distal to wrist including palm, thumb and fingers.
Palm	Anterior aspect of hand excluding thumb and fingers. Includes thenar eminence at base of thumb and hypothenar eminence at base of little finger.
Palmar	(*Adj.*) Pertaining to palm of hand (compare plantar and contrast dorsal).
Thumb	First and most lateral digit of the hand (two bones: proximal and distal phalanges).
Fingers	Medial four digits of the hand. Index (forefinger) most lateral, middle (long), ring and little, the most medial (three bones in each finger: proximal, middle and distal phalanges) (*see* Fig. 1). NOTE — Fingers should be named and not designated by number.
Lower limb girdle	(Formerly pelvic girdle.) Comprising the two hip bones together with the sacrum and their associated joints bounded by buttock, loin, groin and thigh.
Hip	Between lower limb girdle and thigh.
Thigh	Lower limb between groin and hip and above knee below (bone: femur).
Knee	Between thigh and leg (anatomical) around the knee joint.
Popliteal fossa	Area at back of knee joint.

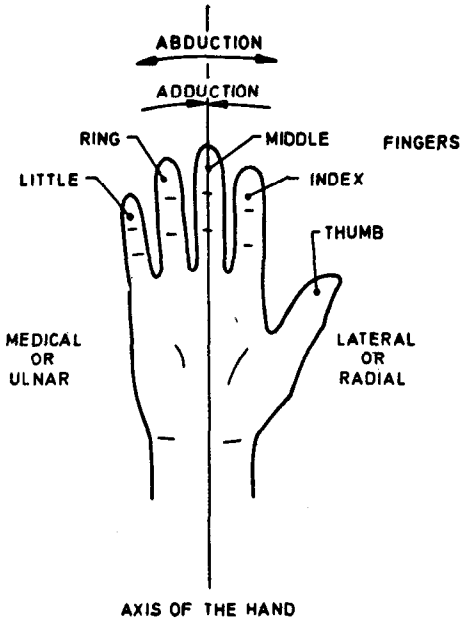

FIG. 1 THE HAND

Term	*Definition*
Leg	(Anatomical.) Lower limb between knee and ankle (shin and calf) (bones: tibia and fibula).
Shin	Hard anterior part of leg (anatomical).
Calf	Posterior part of leg (anatomical).
Peroneal	(*Adj.*) Alternative term to fibular pertaining to lateral aspect of leg (anatomical).
Ankle	Between leg (anatomical) and foot.
Foot	That part of lower limb distal to ankle.
Sole	Under surface of foot.
Plantar	(*Adj.*) Pertaining to the sole of the foot.
Heel	Posterior part of foot and sole related to calcaneus.

Term	*Definition*
Instep	Area between heel and ball of foot including medial longitudinal arch.
Ball of foot	Distal part of sole between instep and toes.
Hindfoot	Posterior half of foot related to tarsal bones and including heel.
Forefoot	Distal part of foot related to metatarsal bones and including ball of foot.
Toes	Digits of foot (*see also* Fig. 2): first — great toe or hallus (two bones: proximal and distal phalanges); second to fifth (three bones each: proximal, middle and distal phalanges): fifth — toe, also called little toe.
Digit	General term referring to thumb, any finger or any toe.

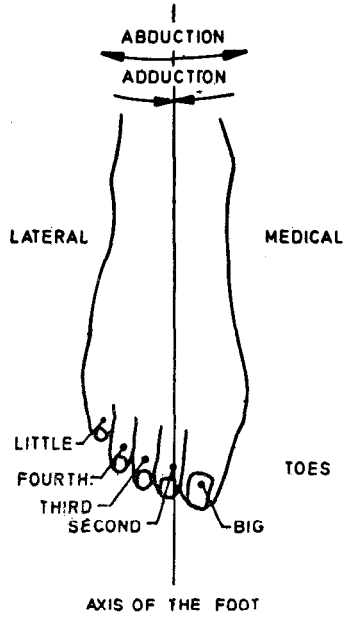

FIG. 2 THE FOOT

Term	*Definition*
2.2 Bones and Cartilages	
Bone	Individual element of skeleton.
Epiphysis	(*Adj.* epiphyseal.) Growth region of a bone. Initially composed of hayaline cartilage later acquiring bony centre which gradually replaces cartilage. A surface may persist to form articular cartilage of the adjacent joint, and another adjacent to shaft of the bone (diaphysis), which forms epiphyseal cartilage plate, disappearing when growth ceases.
Diaphysis	(*Adj.* diaphyseal.) Part of bone between ephyseal plates of their sites.
Shaft	Diaphysis of long bone.
Metaphysis	(*Adj.* metaphyseal.) End of diaphysis of long bone adjoining epiphysis.
Periosteum	(*Adj.* periosteal.) Membrane on free surface of bone (compare perichondrium).
Perichondrium	(*Adj.* perichondreal.) Membrane on free surface of non-articular cartilage.
Condyle	(*Adj.* condylar.) Rounded expansion forming part of end of bone adjacent to joint (for example medial and laterial femoral condyle at knee).
Epicondyle	Projection from condyle (for example medial and laterial humeral epicondyles at elbow).
Tuberosity	Broad eminence on bone, often giving attachment to ligament or muscle, especially tendon (for example greater and lesser tuberosity at upper end of humerus).
Tubercle	As tuberosity, but smaller. Also applied to pathological nodules (notably the lesion characteristic of tuberculosis).
Trochanter	Projection at upper end of femur elsewhere called tuberosity. Greater trochanter is large projection at upper end of femur to which abductor muscles of hip (gluteus, medius and minimus) are attached. Lesser trochanter is prominent process below neck of femur to which main flexor muscle of hip (iliopsoas) is attached.

Term	*Definition*
Trochlea	(*Adj.* trochlear.) Structure acting as a pulley, for example trochlea of the lower end of the humerus which articulates with the trochlear notices on the ulna.
Sesamoid bone	Seed like bone developed in tendon which moves over bony prominence.
Vertebra	(Pl. vertebrae, *adj.* vertebral.) Typical vertebra comprises cylindrical body with an arch posteriorly forming part of vertebral canal containing spinal cord and spinal nerves with coverings (meninges). Bodies are separated by intervertebral discs, comprising peripheral annulus fibrosus and central nucleus pulposus. Vertebral column has seven cervical, twelve thoracic (or dorsal), five lumbar, five sacral and four (usually) coccygeal vertebrae. Sacral vertebrae are fused together and coccygeal vertebrae are rudimentary. Vertebrae of different regions vary greatly; first cervical (atlas) and second cervical (axis) vertebrae are particularly specialized and thoracic vertebrae articulate with ribs.
Sacrum	(*Adj.* sacral.) Fused sacral vertebrae lying caudal to lumbar vertebrae and articulating with os coxae.
Coccyx	(*Adj.* coccygeal.) (Tail bone.) Consists of usually four rudimentary vertebrae lying caudal to sacrum.
Sternum BREAST BONE	(*Adj.* sternal.) Bone forming anterior mid-line part of skeleton of chest wall. Articulates with inner end of clavicle and costal cartilages.
Rib	Curved bony structure lying in chest wall. There are twelve pairs of ribs. Posteriorly they articulate with thoracic vertebrae; anteriorly upper ten pairs are fused to costal cartilages which articulate with sternum.
Clavicle COLLAR BONE	(*Adj.* clavicular.) Medial end articulates with upper part of sternum and outer end with acromium process of scapula. Part of upper limb girdle.
Scapula SHOULDER BLADE	(*Adj.* scapular.) Roughly triangular flat bone forming part of upper limb girdle. Characterized by two processes acromion and caracoid, and shallow oval articular surface, glenoid, acromion articulates with outer end of clavicle; glenoid articulates with humberus.

Term	*Definition*
Humerus	(Pl. humeri, *adj.* humeral.) Upper arm bone. Proximal end characterized by convex head and two tuberosities. Head articulates with glenoid cavity of scapula forming shoulder joint. Distal end characterized by two epicondyles and rounded articular condyle which articulates with proximal ends of radius and ulna (elbow joint).
Radius	(Pl. radii, *adj.* radial.) Lateral of two forearm bones. Proximal end (head) rounded and articulates with humerus (elbow joint) and with ulna. Distal expanded end forms which articulates with carpal bones (wrist joint) and also head of ulna. Movement between radius and ulna termed pronation and supination (*see* pronation and supination).
Ulna	(Pl. ulnae, *adj.* ulnar.) Medial of two forearm bones. Proximal end characterized by trochlear notch which articulates with humerus (elbow joint) and olecranon process (point of elbow). Proximal end also articulates with radius as does distal end (head). Head also characterized by prominent styloid process.
Carpus	(*Adj.* carpal.) Composed of scaphoid, lunate, triquetrum, trapeziun, trapezoid, capitate, hamate, and pisiform bones. Articuates proximally with distal end of radius; distally with metacarpus.
Metacarpus	(*Adj.* metacarpal.) Comprises five metacarpal bones lying between carpus and digits. First metacarpal relates to thumb and second to index, third to middle, fourth to ring and fifth to little fingers.
Os Coxae HIP BONE	(Formerly os innominatum.) Comprising ilium, ischium and pubis. Main part of lower limb girdle, articulating with sacrum and head of femur (hip joint). Anteriorly the two os coxae articulate at symphysis pubis. In child constituent bones are separated by Y-shaped, epiphyseal cartilage in acetabulum (cup-shaped depression forming part of hip joint).
Femur	(Pl. feomra, *adj.* femoral.) Thigh bone. Upper end bears trochanters for muscle attachments and neck carrying head (ball of hip joint), articulating with acetabulum or socket in pelvis. Lower end is extended into two condyles, articulating with patella and tibia (knee joint).

Term	*Definition*
Calcar femorale	(a) Anatomical: Plate of bone formed by condensation of trabeculae at junction of neck and shaft of femur inferiorly and posteriorly. (b) Surgical: Commonly used to denote very strong area at root of neck of femur inferiorly at junction with shaft just above lesser trochanter.
Patella KNEE CAP	(Pl. patellage, *adj.* patellar.) Bone of knee joint, lying in quadriceps tendon, having articular cartilage on its posterior surface which glides over front of articular surface of lower end of femur.
Tibia	(Pl. tibiae, *adj.* tibial.) Major bone of shin (leg proper), extending from knee to ankle.
Fibula SPLINT BONE	(Pl. Fibulage, *adj.* fibular.) Lesser bone of leg proper, serving mainly for attachment of muscles. The lower end forms the outer prominence of the ankle joint.
Talus	(*Adj.* talar.) (Formerly astragalus.) Tarsal bone lying between lower end of tibia and remainder of foot.
Calcaneus CALCANIUM OS CALCIS	(Pl. calcanei, *adj.* calcaneal.) Tarsal bone forming heel, into which achilles tendon (tendocalcaneus) is inserted.
Tarsus	(*Adj* tarsal.) Consists of talus, calcaneus, navicular, cuboid and three cuneiform bones. These bones form the hindfoot.
Metatarsus	(*Adj.* metatarsal.) Composed of five metatarsal bones which lie between tarsus and tors and which form forefoot.
Phalanx	(Pl. phalanges, *adj.* phalangeal.) Bone of finger or toe — proximal and distal in thumb and great toe; proximal, middle and distal in other digits.
Skull	Skeleton of head. Upper part forms box (cranium — *See* Part I of this standard) to protect brain, anterior and lower part underlies face and jaws.

Term	*Definition*
Maxilla	(Pl. maxillae, *adj.* maxillary.) Maxillae, right and left, form whole of upper jaw and contain upper teeth.
Mandible	(*Adj.* mandibular.) Bone of lower jaw containing lower teeth and articulating with skull at temporo mandibular joint.

2.3 Joints

Joint ARTICULATION	(*Adj.* articular.) Occurs where two or more bones of skeleton meet one another.
Symphysis	(Pl. symphyses, *adj.* symphyseal.) Joint between bone ends covered by hyaline cartilage with intervening fibrous disc. All symphyses are in median plane, for example, symphysis pubis at front of lower limb girdle and intervertebral discs. Little movement occurs at these joints.
Synovial joint	Joint between bone ends covered by hyaline articular cartilage with joint cavity around bone ends filled with synovial fluid and surrounded by capsule lined by synovial membrane. Usually considerable range of movement possible at synovial joints.
Synovium SYNOVIAL MEMBRANE	Thin membrane lining synovial joint (except over articular cartilage), bursae and parts of some tendons. It secretes synovial fluid which serves as lubricant and which is important in nutrition of articular cartilage.
Capsule	(Anatomical) (*adj.* capsular.) Fibrous sleeve of joint.
Meniscus	(Pl. menisci, *adj.* meniscal.) Disc crescent of fibrocartilage between surfaces of certain joints, for example, so-called ' cartilage ' in knee joint.
Bursa	(Pl. bursae, *adj.* bursal.) Sac lined by synovium. Found at places of friction or potential friction as normal structure (anatomical bursa), or as abnormal structure friction (adventitious bursa). Also used to describe normal diverticulum of joint (for example, suprapatellar bursa).

Term	*Definition*
Flexion	Angular movement at a joint in the sagittal plane in the direction shown in Fig. 3.

NOTE — Flexion at the shoulder is slightly oblique to the sagittal plane, the upper limb being carried forwards towards the median plane. Flexion of the thumb is almost completely in the coronal plane the thumb being moved across the palm. Dorsi-flexion of the foot is an extension movement. Flexion of the ankle causes plantar flexion of the foot.

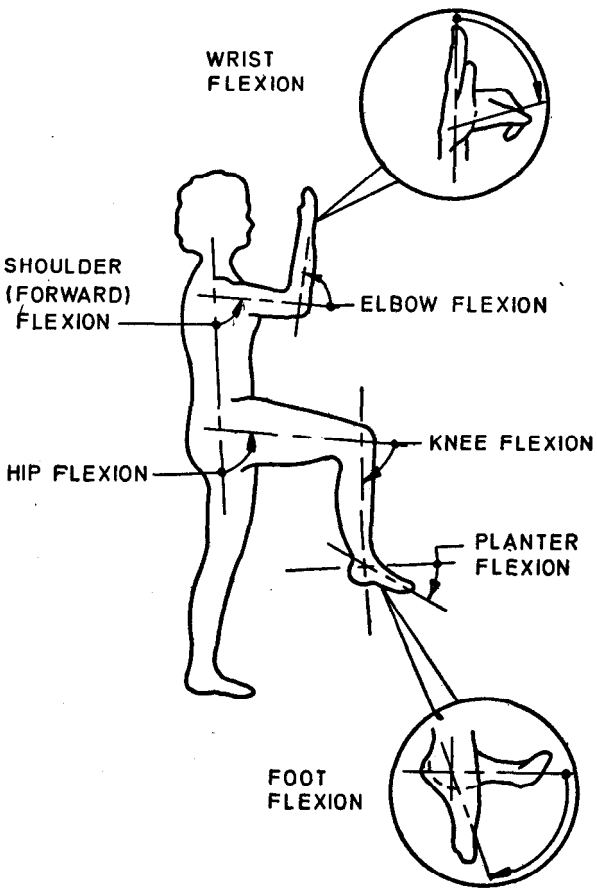

FIG. 3 FLEXION MOVEMENTS

Term	*Definition*
Extension	Angular movement at a joint in the sagittal plane in the direction shown in Fig. 4.

NOTE—Extension at the shoulder is slightly oblique to the sagittal plane, the arm being carried/backwards away from the median plane. Extension of the thumb is almost in the coronal plane, the thumb being carried away from the hand. Extension of the foot is called dorsi-flexion. Extension of the ankle causes dorsi-flexion of the foot.

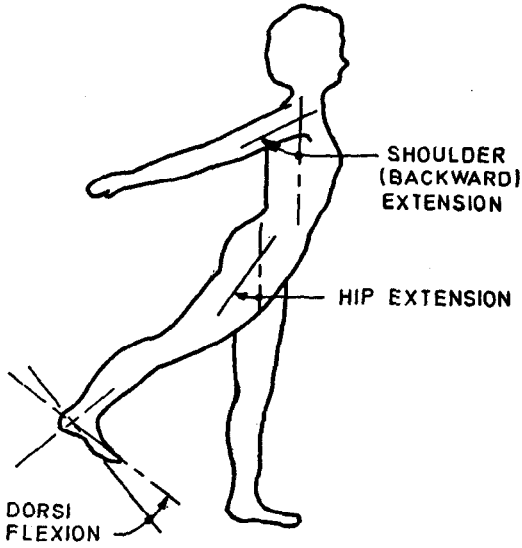

FIG. 4 EXTENSION MOVEMENTS

Adduction	Angular movement at joint in a coronal plane towards the median plane of the body except that (a) in the hand adduction refers to movement towards an axis through the middle finger and the third metacarpal bone, and (b) in the foot an axis through the second toe and second metatarsal bone. Contrast with abduction.

NOTE — Adduction of the thumb carries the thumb towards the palm, almost in the sagittal plane.

Term	*Definition*
Abduction	Angular movement at joint in a coronal plane away from the median plane of the body except that (a) in the hand, abduction refers to movement away from an axis through the middle finger and third metacarpal bone, and (b) in the foot, an axis through the second toe and second metatarsal bone. Contrast with adduction. NOTE — In abduction of the thumb, the thumb is carried away from the palm in the sagittal plane.
Pronation	Rotating forearm inwards; for example with elbow bent, palm faces downwards (contrast supination).
Supination	Rotating forearm outwards; for example with elbow bent, palm faces upwards (contrast pronation).
Opposition	Composite movement of thumb partly abduction and partly rotation around longitudinal axis so that tip of thumb may be brought to touch tips of fingers.
Rotation	Movement of limb around longitudinal axis. In external rotation anterior aspect of limb turns to face laterally; in internal rotation anterior aspect of limb turns to face medially.
Circumduction	Composite movement of flexion, adduction, extension and abduction as one circular movement. Only possible at certain joints, for example shoulder and hip joints.
Inversion	Combined adduction and plantar flexion of the foot so that the sole tends to face the median plane. Compare with eversion.
Eversion	Combined abduction and dorsi-flexion of the foot so that the sole tends to face away from the median plane. Compare with inversion.
Temporomandibular joint	Articulation between condyle of mandible (lower jaw) and base of skull.
Atlanto-occipital joint	Articulation between base of skull and first cervical vertebra (axis vertebra).
Atlanto-axial joint	Articulation between first (axis) and second (atlas) certical vertebrae.

Term	*Definition*
Sterno clavicular joint	Joint between medial end of clavicle and sternum. Movement at this and acromio clavicular joint allow considerable movements between upper limb girdle and chest wall thus increasing considerably range of movement of whole upper limb.
Acromic clavicular joint	Joint between lateral end of clavicle and acromion process of scapula.
Shoulder joint GLENO-HUMERAL JOINT	Joint between shallow glenoid cavity of scapula and convex head of humerus. Muscles which abduct shoulder joint (supraspinatus and deltoid) have special surgical importance. Movements of the upper limb girdle involve the shoulder, acromio-clavicular and sterno-clavicular joints and movement between the scapula and chest wall.
Elbow joint	Joint between distal end of humerus (bone of arm proper) and proximal ends of radius and ulna (bones of forearm). Extended by triceps muscle in back of arm and flexed by brachialis and biceps muscles. Latter muscle also supinates forearm.
Radio-ulnar joints	Superior and inferior joints at each end of radius and ulna allow rotatory movements of forearm termed pronation and supination.
Wrist joint	Joint between distal end of radius and proximal row of carpal bones — scaphoid, lunate and triquetrum.
Carpometacarpal joint	Joint between carpal and metacarpal bones. Of importance is carpometacarpal joint of thumb — adapted to allow wide range of movement of thumb, particularly opposition.
Metacarpophal-angeal	Joint between metacarpal bone and proximal phalanx of any digit of hand.
Interphalangeal joint	Joint between phalanges of digits. In all fingers and second to fifth toes there are tow interphalangeal joints — proximal between proximal and middle phalanges and distal between middle and distal phalanges.
Sacro-iliac joint	Articulation between sacrum and iliac part of os coxae. Although synovial joint it has very little movement.

Term	*Definition*
Hip joint	Ball and socket joint between convex head of femur and concave acetabulum or socket in os coxae (bony pelvis).
Knee joint	Joint between femur and tibia, including also joints between femur and patella (knee cap).
Ankle joint	Joint between tibia, fibula and talus.
Subtalar joints	(Formerly talo-calcaneal joint.) Bipartite joint between the talus and calcaneus which in association with the talonavicular joint allows movements of inversion and eversion.
Midtarsal joint	Joint between talus and calcaneus proximally and navicular and cuboid bones distally.
Tarsometatarsal joint	A complex joint between cuneiform and cuboid bones proximally and bases of metatarsal bones distally.
Metatarsophalangeal joint	Joint between distal end (head) of metatarsal bone and proximal phalanx of toe.

2.4 Muscle and Ligaments

Muscle	Aggregation of muscle fibres. Lean meat.
Muscle origin	Attachment of one end of muscle. Usually proximal end in a limb (contrast insertion).
Muscle insertion	One attachment of muscle or tendon of muscle. Usually distal attachment in limb (contrast origin).
Contraction	Activation of muscle tissue.
Isometric contraction	Contraction of muscle without change in length. Increase in tension in muscle occurs (contrast isotonic contraction).
Isotonic contraction	Contraction of a muscle without change in tension within the muscle but with shortening of the muscle (contrast isometric contraction).
Deltoid muscle	Muscle over point of shoulder originating from upper limb girdle inserted into humerus and concerned with abduction of shoulder joint.
LIGAMENTUM PATELLAE	

Term	*Definition*
Biceps muscle	Commonly muscle forming prominent bulge on front of upper arm — biceps brachii. There is also a biceps muscle in thigh (biceps femoris) one of the Hamstring muscles.
Thenar muscles	Small muscles at base of thumb forming thenar eminence of palm.
Hypothenar muscles	Muscles overlying fifth metacarpal bone forming hypothenar eminence of palm.
Intrinsic muscles	Small muscles in hand and foot which help to control movements of digits — include thenar, hypothenar, interosseous, lubrical and some other muscles.
Gluteus muscle	(Pl. glutei, *adj.* Gluteal.) Large muscles forming bulk of buttock and responsible for abduction and extension of hip joint. Most important in maintenance of upright posture during standing and locomotion.
Quadriceps femoris muscle	Muscle of front of thigh whose contraction extends (straightens) knee.
Hamstring muscles	Muscles of back of thigh which flex (bend) knee.
Calf muscles	(Triceps surae — obsolete.) Responsible for bulk of calf. Contraction depresses front of foot (as in tiptoeing) — therefore important in walking, running and jumping.
Tendo Achillis TENDO CALCANEUS ACHILLES TENDON	Large tendon inserted into calcaneus (heel bone) and powered by calf muscles. Contraction of calf muscles pulls up heel so depressing forefoot.
Patellar ligament	Tethers lower part of patella to tibia thus acting as tendon of quadriceps muscle, contraction extends knee; hence alternative name patellar tendon — contrary to official nomenclature and convention of qualifying name of tendon by name of its muscle.

NOTE — Example of irregular terminology — 'patellar' tendon (sic) bearing (P T B) prosthesis or related orthosis.

Term	*Definition*
Ligamentum teres	Rounded ligament — like structure containing an artery joining head of femur to inferior part of acetabulum of os coxae (pelvic bone).
Cruciate ligaments	Two ligaments in knee joint, joining femur to tibia. Called anterior and posterior they prevent gliding of tibia on femur.

2.5 Pathology

Rarefaction	Term indicating thinning of bone in radiographs.
Osteoporosis	Thinning of the mineralised components of a bone with or without reduction of the number of trabeculae. This may affect part of or the whole of a bone or the skeleton.
Osteomalacia	Histiological appearance characteristic of lack of vitamin D: loss of calcium salts from bone with increase in unmineralized tissue (osteoid).
Osteoid	Unmineralized new bone tissue; mainly collagen fibre with osteocytes.
Sclerosis	Bone which appears denser than normal on radiographs.
Dysplasia	Abnormal development of bone during growth.
Fracture	Break in a bone.
Traumatic fracture	Fracture due to violence.
Green stick fracture	Incomplete traumatic fracture of immature bone.
Infracture	Traumatic fracture of part of the circumference of a bone.
Avulsion fracture	Fracture which results in a fragment of bone being pulled off by soft tissues (for example ligament or muscle).
Fatigue fracture	Of bone, fracture often incomplete resulting from unaccustomed pattern of activity.

Term	*Definition*
Pathological fracture	Fracture of diseased bones, for example bone eroded by tumour or bone rendered fragile by constitutional disease or disuse such as osteogenesis imperfecta, osteitis deformans (paget's disease), osteoporosis or osteomalacia; in the last terms pseudo fracture, insufficiency fracture, transformation zone or looser's zone are often applied.
Open fracture	(Compound fracture — deprecated.) Fracture with external wound in continuity.
Closed fracture	(Simple fracture — deprecated.) Fracture without overlying wound in continuity.
Undisplaced fracture	Fracture with no shift of bone fragments on each side of fracture line.
Displaced fracture	Fracture in which there is shift of bone fragments at fracture site.
Complicated fracture	Fracture with injury to adjacent important structure, for example major nerve or artery.
Union	(Fracture.) Union has occurred when there is no longer clinically detectable movement at, nor pain on, stressing fracture site.
Delayed union	(Fracture.) Failure of fracture to unite within usually acceptable time for that particular fracture. Cortex has not grown across bone ends. With prolongation of efficient conservative treatment union usually occurs.
Non-union	(Fracture.) Established failure of union of fracture. Cortex has extended across fracture surfaces creating separate bones with persistent gap (pseud arthrosis). Union cannot be expected without operation.
Malunion	(Fracture.) Union at fracture with displacement of bone ends from normal anatomical position causing physiological disability.
Callus	(Fracture.) Repair tissue which develops around fractured ends of bone. Callus present before union occurs may be called provisional callus. Bone formation in callus is initially poorly organized (woven bone) but following union remodelling occurs to form cortical or cancellous bone as appropriate.

Term	*Definition*
Consolidation	(Fracture.) Consolidation has occurred when fracture callus has been converted into normal bone. The fractured bone can now assume normal function.
Stable	(Fractures and joints.) (Noun stability.) Indicates that displacement is unlikely without further injury.
Periostitis	Inflammation of periosteum.
Periosteal reaction	Appearance of new bone formation under periosteum usually resulting from stripping up of periosteum from bone.
Osteomyelitis	(*Adj.* osteomyelitic.) Infection of bone. Usually acute but can be chronic.
Osteitis deformans	(Paget's disease.) Benign, painful reactive process occurring in bone particularly in older age.
Exostosis	Projection from a bone due to minor aberration during growth. Usually solitary but may be multiple–inherited disease (diaphyseal aclasis).
Osteosarcoma	Malignant tumour of bone — cells of tumour being predominantly bone producing cells (contrast chondrosarcoma and fibrosarcoma).
Chondrosarcoma	Malignant tumour of bone whose cells tend to form cartilage (contrast osteosarcoma and fibrosarcoma).
Giant cell tumour OSTEOCLASTOMA	Tumour of bone consisting of giant cell with background of spindle or oval cells occurring at the ends of skeletally mature bone. Tumour may be benign but commonly recurs after removal and may become frankly malignant.
'Giant cell variants'	Tumours and cysts, all benign, occurring in bone, that contain giant cells and may be confused with giant cell tumour.
Monostotic	(*Adj.*) Indicates affection of one bone only (contrast polyostotic and compare monarticular).
Polyostotic	(*Adj.*) Indicating affection of many bones (contrast monostotic and compare polyarthritic).
Apophysitis	Inflammation of an apophysis usually resulting from excessive muscle stress on the apophysis.

Term	*Definition*
Osteochondritis	Affection of bone and overlying articular cartilage probably due to damage to the blood supply of the affected bone. Usually occurs in adolescents and young adults.
Avascular necrosis of bone	Death of bone due to interruption of blood supply.
Spondylolysis	Break in the posterior arch of vertebra.
Spondylolisthesis	Condition in which body of vertebra slips forward on body of vertebra below. May result from spondylolysis.
Spondylosis	Changes in spine due to degenerative changes in intervertebral discs. Characterized by narrowing of disc space, osteophyte formation and sclerosis of bone adjacent to disc space.
Synovitis	Inflammation of synovial membrane.
Synovial effusion	Collection of fluid within joint secreted by synovium in response to injury, inflammation, etc.
Arthrosis	Non-infective disease of joint.
Haemarthrosis	Blood within joint cavity due to haemorrhage (usually following injury).
Pyoarthrosis	Pus within joint cavity arising from infection outside the joint and before the joint tissues become infected. Compare with septic arthritis.
Osteoarthrosis osteooarthritis	Degenerative changes occurring in joint characterized by pain, swelling, stiffness, loss of articular cartilage, bone sclerosis and osteophyte formation.
Chondromalacia	Softening of articular cartilage. First stage of osteoarthrosis.
Arthritis	Inflammation of joint. Loosely used to indicate any joint pathology.
Septic arthritis PYOARTHRITIS	Inflammation of joint due to infection—synovitis with pus in joint (contrast pyoarthrosis).
Rheumatoid arthritis	Arthritis associated with rheumatoid disease characterized by effusion, synovitis, bone erosion and pannus formation.

Term	*Definition*
Monarthritis	(*Adj.* Monarthritic) Arthritis affecting only one joint (contrast polyarthritis).
Polyarthritis	(*Adj.* Polyarthritic) Arthritis affecting many joints (compare monarthritis).
Osteophyte	New bone formation at margin of articular cartilage occurring in osteoarthrosis or resulting from stripping up of soft tissues at margin of joint.
Dislocation	(Joint.) Complete loss of congruent articulation of the bones, forming a joint in association with abnormality of or damage to the joint capsule.
Congenital dislocation	(Joint.) Dislocation present before or at time of birth.
Traumatic dislocation	(Joint.) Dislocation due to injury.
Pathological dislocation	(Joint.) Dislocation of joint due to disease affecting the tissues comprising the joint or paralysis of muscles controlling the joint.
Subluxation	(Joint.) Incomplete dislocation. This usually results in some loss of function of the affected joint.
Recurrent dislocation	(Joint.) Repeated dislocation resulting from loading which would be usually insufficient to dislocate a normal joint.
Habitual dislocation	(Joint.) Dislocation of joint which occurs whenever joint is used, for example lateral dislocation of patella on bending knee.
Ankylosis	Stiffening of joint due to damage to joint surfaces by disease or injury. Ankylosis may be fibrous or bony (compare arthrodesis).
Ganglion	(Synovial.) Cyst derived from synovium of joint or tendon sheath. Benign.
Synovioma	Malignant tumour derived from synovial tissue.
Myopathy	Any disease of muscle tissues.
Myositis	Inflammation of muscle.

Term	*Definition*
Post traumatic myositis ossificances	Formation of bone within muscle or tendon following injury to muscle often close to bone. Commonly occurs at the elbow, in the quadriceps muscles in the thigh and in the origin of the hamstring muscles.
Tenosynovitis	Inflammation of synovium of tendon sheath.
Bursitis	Inflammation of bursa.
Fasciitis	Literally, inflammation of fascia but usually used more loosely indicating any affection of fascia, for example palmar fasciitis (Dupuytren's contracture).
Fibromatosis	Locally aggressive proliferation of fibrous tissue cells prone to recur after excision.
Fibrosarcoma	Malignant tumour derived from fibrous tissue.
Muscle spasm	Involuntarily sustained contraction of muscle, usually painful.
Cramp	Painful muscle spasm often associated with fatigue or upset body chemistry.

2.6 Deformities and Abnormalities

Valgus

(*N.* Valgum, *F.* Valga.) Deformity or displacement in which axis of distal segment deviates away from mid-line in relation to proximal segment (*see* Fig. 5 and 6).

If deviation is in shaft of a bone distant from joint, valgus is used to qualify the particular bone, for example tibia valga for medially bowed tibia or femur valgum for medially bowed femur.

Exceptionally, deviation is at joint itself. More often, deviation is extra-articular in juxta-articular bone, that is close to the joint, when customarily (but not always) valgus is used loosely to qualify name of the joint, for example cubitus valgus where site of deformity is commonly in lower end of humerus.

At hip valgus deformity is commonly at base of neck of femur (angle between upper part of femur and shaft is widened). Strictly, this is femur valgum and not abduction deformity at hip joint itself, but is by custom described as coxa valga referring to hip as a region rather than purely as a joint.

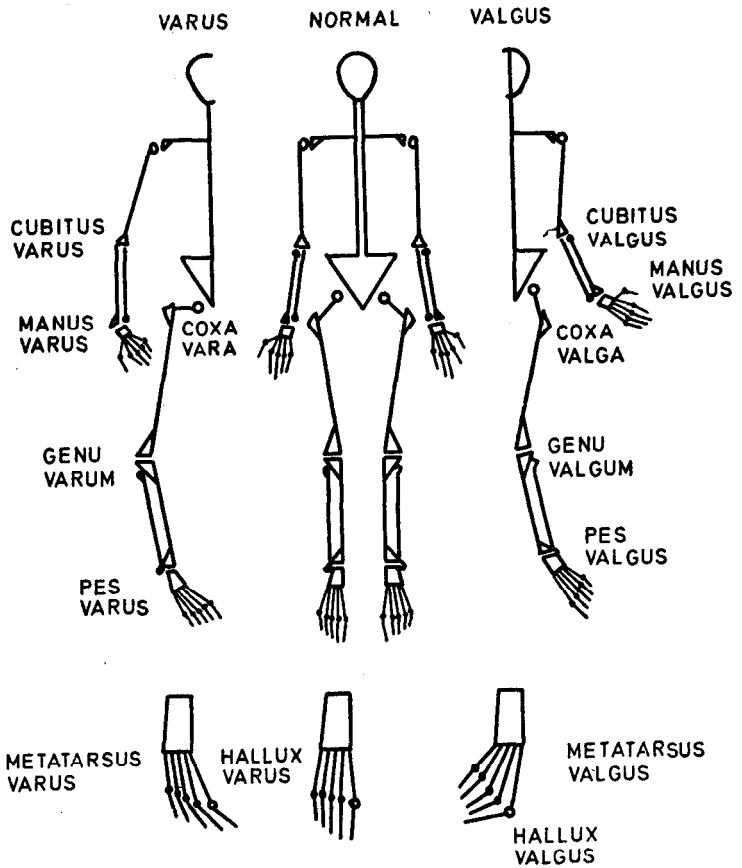

FIG. 5 VARUS AND VALGUS CONDITIONS

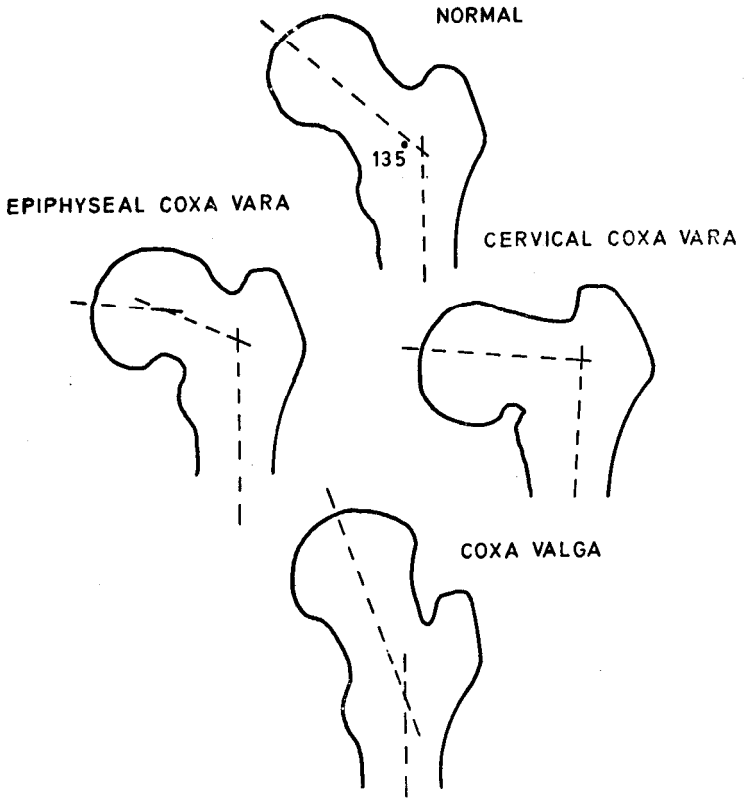

FIG. 6 VARUS AND VALGUS CONDITIONS AT NECK OF FEMUR

Term	*Definition*
	Valgus also applied to osteotomies or prostheses designed to produce such anatomical deviation, for example valgus osteotomy to produce valgus deviation or to correct varus. NOTE — In relation to prostheses valgus should not be used to indicate angle at which, at operation, stem of prosthesis is inserted in relation to axis of shaft of bone but should only be used to indicate anatomical position consequently produced in relation to the associated joint. If stem of prosthesis is not placed axially in the shaft of the bone its position should be described as being abducted or abducted relative to the axis of that bone.
Varus	(*N.* Varum, *f.* Vara) Deformity or displacement in which axis of distal segment deviates towards mid-line in relation to proximal segment (*see* Fig. 5 and 6).

Term	*Definition*
	If deviation is in shaft of a bone distant from joint, varus is used to qualify the particular bone, for example tibia vara for laterally bowed tibia or femur varum for laterally bowed femur. Exceptionally, deviation is at joint itself. More often, deviation is extra-articular in juxta-articular bone, i. e. close to the joint when customarily (but not always) varus is used loosely to qualify name of the joint, for example cubitus varus where site of deformity is commonly in lower end of humerus. In hip, varus deformity can be at epiphyseal plate of femoral head (epiphyseal coxa vara), or at neck of femur (cervical coxa vara), both tending to narrow angle between upper part and shaft of femur. Strictly this is femur varum and not abduction deformity at hip joint itself, but it is by custom described as coxa vara referring to hip as a region rather than purely as a joint. Varus also applied to osteotomies or protheses designed to produce such anatomical deviation, for example varus osteotomy to produce varus deviation of to correct valgus. NOTE — In relation to prostheses, varus should not be used to indicate angle at which, at operation, stem of prosthesis is inserted in relation to axis of shaft of bone but should only be used to indicate anatomical position consequently produced in relation to the associated joint. If stem of prosthesis is not placed axially in the shaft of the bone its position should be described as being adducted or abducted relative to the axis of that bone.
Abduction deformity	Deformity in which limb distal to damaged joint or bone is angled towards median plane. In thumb angulation is towards plane of palm (contrast abduction deformity and compare adduction).
Abduction deformity	Deformity in which limb distal to affected joint or bone is angled away from medial plane. In thumb angulation is away from plane of palm (contrast adduction deformity and compare abduction).
Fixed deformity	Deformity at a joint in which the range of movement in one or more planes is limited so that the joint cannot be brought to the neutral position. Some movement is possible from the position of fixed deformity and away from the neutral position (compare ankylosis).

Term	*Definition*
Fixed flexion	Fixed deformity in which joint is held in flexed position and cannot be extended to the straight or neutral position.
Fixed adduction	Fixed deformity in which joint is held in adducted position and cannot be abducted to the neutral or mid position.
Fixed abduction	Fixed deformity in which joint is held abducted and cannot be brought to the neutral or mid position.
Fixed internal rotation	Fixed deformity in which joint is held in internal rotation and cannot be externally rotated to reach the mid position of movement.
Fixed external rotation	Fixed deformity in which joint is held in external rotation and cannot be internally rotated to reach the mid position of movement.
Equinus	Alternative term used with respect to the foot with fixed plantar flexion deformity.
Calcaneus	Deformity. Term applied to fixed dorsiflexion deformity of foot (so called because weight is now borne on heel) — see calcaneus (bone).
Joint laxity	Condition of joint in which llgaments and capsule are looser than normal, allowing excessive or abnormal movement to occur at joint.
Hyperflexion	Position of flexion or a range of flexion movements of a joint greater than normally expected.
Hyperextension	Position of extension or a range of extension movements of a joint greater than normally expected.
Contracture	(Muscle.) Pathological shortening of soft tissues in the region of a joint resulting in restriction of the range of movement of the joint.
Pes cavus	Deformity of foot due to dropping of forefoot resulting in high arch at instep. Usually associated with claw toes.
Pes arcuatus	Foot with an exaggerated longitudinal arch, bilateral, usually developmental, often familial. The toes are not involved as part of this deformity.

Term	*Definition*
Pes planus FLAT FOOT	Deformity of foot due to collapse of the arch on inner border of foot.
Claw toes	Deformity of toes in which interphalangeal joints are flexed and metatarsophalangeal joint are hyperextended. The position of toes cannot be corrected by muscle action.
Hammer deformity	Fixed flexion deformity of the proximal or distal interphalangeal joint of toe, or of both of these joints.
Mallet deformity	Flexion deformity of distal interphalangeal joint of finger or thumb.
Swan neck deformity	Deformity of finger comprising hyperextension of proximal interphalangeal joint and mallet deformity.
Boutonnierre deformity BUTTONHOLE DEFORMITY	Deformity of finger comprising fixed flexion deformity of proximal interphalengeal and hyperextension of distal interphalangeal joint.
Muscle wasting	Atrophy of muscle due to disuse, for example after injury or from paralysis.

2.7 Surgical Procedures

Reduction	(a) (Of a fracture.) Act of restoring normal relationship between fragments of fractured bone. (b) (Of a joint.) Act of restoring congruous articulation of a dislocated or subluxed joint.
Fixation	(Fracture.) Action of holding fracture or joint in reduced position. External fixation achieved by applying splints to affected limb: Internal fixation achieved by applying plates and screws, intramedullary nails, bone grafts, etc.
Osteosynthesis	Fixation of fracture fragments by means of implants.
Osteotomy	Cutting bone with surgical instruments. This may be used to correct bone or joint deformities or to relieve pain in osteoarthritic joints.

Term	*Definition*
Adduction osteotomy	Osteotomy performed to angulate bone so that limb distal to osteotomy is adducted compared with its original position.
Abduction osteotomy	Osteotomy performed to angulate bone so that limb distal to osteotomy is abducted compared with its original position.
Osteoclasis	Therapeutic fracture of bone to correct deformity (compare same word for cellular erosion of bone by osteoclasts).
Osteotomy-osteoclasis	Cutting partly through bone followed by breaking remainder (used if angulation alone is to be corrected or produced).
Laminectomy	Excision of laminae (posterior part of arch of vertebra). Hemilaminectomy is excision of lamina on one side only.
Intervertebral discectomy	Excision of intervertebral disc. In cervical spine this is achieved through anterior approach. In lumbar spine, posterior approach is used—laminectomy or hemilaminectomy may be used to facilitate the excision.
Arthroscopy	Inspection of the interior of a joint through a special instrument (arthroscope).
Arthrotomy	Incision of joint.
Capsulotomy	Division of capsule of joint.
Capsulectomy	Excision of capsule of joint.
Synovectomy	Excision of synovial membrane from joint or tendon.
Meniscectomy	Excision of meniscus (usually from knee).
Arthroplasty	Refashioning of a joint to improve joint function by reshaping, with or without excision of bone or interposition of natural or artificial materials.
Joint replacement	Replacement of part (partial) or whole (total) of joint by an endoprosthesis.
Arthrodesis JOINT FUSION	Operation to stiffen permanently a joint in the bes functional position (compare ankyiosis).

Term	*Definition*
Disarticulation	Amputation through joint.
Tenotomy	Division of tendon often as part of an operation to increase or decrease its length.
Tenolysis	Freeing tendon from surrounding tissues.
Tenodesis	Fixation of tendon to bone, usually using tendon to act as a ligament.
Tendon transfer	Transfer of insertion of tendon to another site to alter point of action of associated muscle.
Tendon transplant TENDON GRAFT	Transplantation of autogenous tendon graft to replace damaged tendon. Frequent use of term for tendon transfer is deprecated.
Fasciotomy	Division of fascia.
Fasciectomy	Exclusion of fascia.
Neurectomy	Excision of nerve.
Neurolysis	Freeing nerve from surrounding tissues.

2.8 Surgical Instruments

Osteotome	Type of chisel for cutting bone.
Tenotome	Knife with a small blade designed originally for dividing tendons subcutaneously through a small skin puncture instead of through a more extensive incision.
Meniscotome	Fixed bladed knife of various designs used during menisectomy.
Periosteal elevator RUGINE	Instrument with a flat or curved blade used to strip soft tissues from bone.
File	Tool for removing material by abrasion or by the cutting action of fine ridges.
Rasp	Coarse file with teeth in the form of raised points used to smooth bone edges. Specially shaped rasps are used to ream holes in medulla of bones to accept stemmed internal prostheses.
Drill	Rotary drill used to bore holes.

Term	*Definition*
Reamer	Rotary cutting tool used to enlarge or impart accuracy to parallel or tapered holes.
Broach	Cutting tool for machining holes consisting of a shaft carrying a transverse cutting edges. The tool is driven or pulled through a roughly finished hole.
Burr	Small rotary file or rasp of suitable profile.
Awl	Pointed instrument for making holes in bone often with eye near tip through which suture material can be threaded. Hand-powered.
Tap	Instrument used to cut a screwthread in a drilled hole before inserting a non-self-tapping screws.
Lever	Flattened instrument passed round a bone and used to retract soft tissues away from it.
Mallet	Any form of hammer used in orthopaedic surgery.
Punch	Blunt rod for conducting driving force of mallet. Bone punch has flattened end (in operative surgery, punch is not a piercing tool).
Bone-cutting forceps	Forceps with straight or slightly curved sharp edges for cutting bone.
Bone-nibbling forceps BONE RONGEUR	Forceps for biting into edge of bone, for example Gouge and punch forceps.
Bone-holding forceps	Forceps designed to grip bone.
Amputation saw	Tenon type saw, usually with hinged stiffener along back edge.
Hacksaw	Saw with narrow detachable blade in bow-shaped holder.
Wire saw	(for example Gigli saw). Flexible saw passed subperiosteally behind bone to divide it by side-to-side motion. Threaded extraduraly through burr holes, it can be used for resecting cranial bone.
Gonimeter	Instrument used for measuring angular deformity or motion at joint.

Term	*Definition*
2.9 Implants — Fastening Systems and Devices	
General	
Fastener	Any device to attach another implant to bone or another implant. May also be used to its own to fix bone fragments together.
Compression implant	Implant adapted to obtain fixation by compressing bone fragments together.
Wires	
Wire	Metal product of uniform cross-section produced by drawing process. Hard drawn resilient wire usually up to 2·0 mm diameter. Softened malleable wire of up to 1·2 mm diameter may be used.
Wire suture	Malleable strand of monofilament or braided wire up to 1·2 mm diameter.
Guide GUIDE WIRE	Wire used to direct placing of an implant. Usually 2·5 mm diameter. It may be etched with graduation marks.
Transfixion wire	Rigid wire up to 2 mm diameter, used for fixation of bone fragments and fractures of smaller bones or arthrodesis of small joints. Usually supplied with three-sided shank and diamond point.
Traction wire	(for example Kirschner wire.) Wire of high tensile strength used for application of skeletal traction. Wire is held taut by distraction stirrup.
Pins and rods	
Pin	Relatively rigid hard drawn wire used for skeletal traction pins, transfixion pins and other rigid wire fixation devices. Usually of 2·0 mm to 4·0 mm diameter.
Traction pin	(For example steinmann pin.) Pin used for application of skeletal traction. 2 5 mm to 6·0 mm diameter and between 200 mm and 250 mm in length, with trochar or diamond point at one end and three-face shank at other end.

Term	*Definition*
Transfixion pin	Pin used to secure fractures of neck of femur or secure epiphysis of upper end of femur. 2·5 mm to 4·0 mm diameter with various lengths up to 300 mm. A part of the shaft may be screw threaded.
Spinal rod	Any rod used to stabilize the spine, for example Harrington's rods used in the treatment of scoliosis.
Nails and staples	
Nail	(As fastener.) Metal implant of form comparable with traditional nail. Used for holding small fragments of bone or articular cartilage.
Staple	Metal implant of U-form adapted for driving into bone. Forged or cast for strength.
Bone screws	
Bone screw	Screws devised for use in bone. They may be: (a) machined from rod, (b) cast, and (c) machined from cast blanks.
Head	Expanded end of screw with recess for screwdriver and with countersink if present.
Head recess	Aperture into which screwdriver fits to provide turning movement during insertion of screw. Recess may be single slot, crossed slots, or recessed shape, for example hexagonal.
Land	Surface of cylindrical portion between rounded top of head and countersink.
Head countersink	Pressure face beneath head of screw. This may be spherical, conical or flat.
Shank	Unthreaded portion of screw between thread run out and countersink portion of head.
Thread run out	End of threads beneath head of screw.
Screw thread	Ridge of uniform section in form of helix on external surface of cylinder point.
Screw point	End of screw, usually blunt, driven into bone.

Term	*Definition*
Self-tapping flute	Groove machined in leading edge of screw intersecting several threads to provide cutting edge which enables screw to cut its own thread in a drilled hole in bone.
Self-tapping screw	Screw with self-tapping flutes on point.
Non-self-tapping screw	Screw without self-tapping flutes.
Bolts, nuts and washers	
Bolt	Fully or partially externally threaded rod with either hexagonal slotted head or round domed head with cross slot.
Self-locking bolt	Bolt with nylon insert fitted flush with cresh of thread.
Nut	Shaped metal collar, usually hexagonal, with internal screw thread to mate with externally threaded device.
Self-locking nut	Nut with device to prevent loosening.
Plain washer	Annular device used to protect bone surface under a nut or screw head by distributing pressure.
Locking washer	Washer designed to prevent nut or bolt from turning. In surgery it is either hexagonal with four ridges or oblong with two narrow sides bent at an angle of 90°.
Other nails	
Hip nail	Finned nail, nowadays cannulated, with head that may be plain or adapted for fixation with a corresponding trochanteric plate.
Salf-adjusting nail	Freely telescopic hip nail as part of nail plate.
Medullary nail INTRAMEDULLARY NAIL	Implant for introduction into narrow cavity of long bones forming internal splint. Nail may be straight or curved and of V-, clover-leaf (for example kuntscher nail) or circular cross section.

2.10 Bone Plates, Nail Plates and Blade Plates

Bone plate	Strip of material, usually metal, of various sizes perforated by a number of holes. Used in conjunction with screws or other fastening devices to join fragments of bone.

Term	*Definition*
Self-compressing plate	Plate designed so that longitudinal compression of bone fragments is achieved when screws are fully tightened onto the plate.
Nail plate	Bone plate continuing into a formed section, which is lodged within the bone. Usually the formed part is at an angle to the plate.
Blade-plate	Plate continuing into a flat section which is lodged within the bone.
Spinal plate	Curved or straight plate usually used in pairs to hold two or more vertebrae together and applied posteriorly using bolts and nuts.

2.11 Joint Replacements

Partial joint replacement	Implant which is a substitute for one or part of one, or part of both articular surfaces of a joint. Fixation of a component to bone may be achieved by grouting material (for exmaple, acrylic cement), by ingrowth of bone into slots or porous surfaces or by fastening devices.
Total joint replacement	Implant which is a substitute for all load transmission (but not necessarily all articular) surfaces of a joint, except for total joint replacement at the knee and elbow, the patello-femoral and radio-humeral joints respectively may not be replaced.
Totally constrained joint replacement	Joint replacement in which components are linked in such a way that the bearing surfaces remain in contact throughout the range of movement of the joint in the unloaded state.
Partially constrained joint replacement	Joint replacement in which components are linked in such a way that in the unloaded state separation of the components may occur during some or all of the available range of movement.
Non-restrained joint replacement	Joint replacement in which there is no mechanical attachment between the components. Functional stability in the body depends on their geometry and the restraint of the surrounding body tissues.